

Potential integration of cadmium lab chip with immunoassay using quantum dot/antibody probe for detection of microcystin-LR

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ABSTRACT

Quantum dots (QDs) were used to detect quickly pathogenic microorganisms in sea water. The size is an important parameter that determines the chemical and physical properties of nanoparticles. In order to measure the size of water soluble nanoparticles, QDs, field-flow fraction (FFF) was used. Different sized water-soluble nanoparticles were effectively separated. As an indirect measurement of target analyte, instead of conventional fluorescent optical methods, we measured amount of cadmium ions using anodic stripping voltammetry since major component of core-shell CdSe/ZnS QDs used for immunoassay of cyanobacterial hepatotoxin microcystin-LR was cadmium. In addition, we developed a lab chip (LC) to measure electrochemically cadmium in water. For our further research, it will be integrated with immunoassay method to develop portable lab chip monitoring system QDs for the detection of cyanobacterial hepatotoxin microcystin-LR. The quantum dots-antibody (QD/Ab) and QD-labeling methods were simple, sensitive, reproducible, and selective.

Keywords: Field-flow fraction (FFF); Lab-on-a-chip; Nanoparticle; Quantum dots (QDs); Quantum dot-antibody probe

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